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EXAMINER
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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 33

Application Number: 08/892,836
Filing Date: July 17, 1997
Appellant(s): Skeem et al.

Mary Porter
For Appellant

EXAMINER'S ANSWER

This is in response to appellant's brief on appeal filed May 17, 1999.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

The brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the

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pending appeal is contained in the brief. Therefore, it is presumed that there are none. The Board, however, may exercise its discretion to require an explicit statement as to the existence of any related appeals and interferences.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellant's brief includes a statement that claims 1, 3-26, and 28- 34 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) *Prior Art of Record*

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

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5,018,276	Asada	5-1991
5,215,072	Scott	6-1993
3,894,673	Lowder et al.	7-1975

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-26, and 28-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asada'276 in view of Scott'072 and Lowder et al.'673.

With reference to Figures 7-9, Asada discloses an abrasive cutting tool comprising: a) a monolithic substrate (5) having a substrate surface with plurality of teeth (7) extending therefrom, each tooth having a contoured surface; b) a layer comprising superabrasive grains (8) such as diamond, the layer being electroplated to at least a portion of the surface of each tooth to define a plurality of cutting levels parallel to the substrate surface, and each cutting level on each tooth being oriented such that a portion of each cutting level overlaps at least a portion of each other cutting level of the tooth; and c) an initial uppermost cutting level and successive uppermost

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cutting levels among the plurality of cutting levels of each tooth, whereby after the initial uppermost cutting level has been worn away by cutting the workpiece, each successive uppermost cutting level of the tooth presents to the workpiece a ring of superabrasive grain around the contoured surface of the tooth, and substantially all superabrasive grain within the ring simultaneously engages in cutting. But Asada does not disclose the cutting surface having a negative angle of inclination with respect to the intended direction of movement and the abrasive layer being chemically bonded to at least a portion of the surface of each tooth.

With reference to Figs. 2-4, column 4, line 50 bridging to column 5, line 50, Scott discloses that the mesh cutting element 34 defines a surface inclined relative to the travel direction 50 of the cutting tool. The cutting element 34 is a mesh comprising abrasive material formed by uniformly distributing and securing hard, wear resistance particles, such as industrial diamonds. The cutting mesh is bonded to the support links by an adhesive agent such as industrial epoxy or by brazing. The bonding agent may also include a layer or wearable or consumable material to provide additional support for the cutting mesh on the support links. With reference to Fig. 8, column 7, line 33 bridging to column 8, line 12, the inclination of the planar surface of the mesh, whether it is on the support or the cover, applies only a relatively small area of the trailing edge of the mesh cutting element to the material cut. This reduces the area of contact between the material to be cut and the cutting element, and thereby reduces the force required to accomplish the cutting action. As the mesh cutting element 34 wears at its trailing edge, some of the consumable material 48 following the cutting element 34 also wears away. However, it always

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leaves a next row of particles in abrading contact with the material to be cut. In essence, Scott discloses a cutting element having a cutting surface with a negative angle of inclination with respect to the intended direction of movement. Furthermore, Scott discloses in column 8, lines 16-18, this cutting element with its inclined cutting surface may be applied to a circular saw. But Scott is silent about the brazing method to chemically bond the abrasive layer to the surface of the tooth.

With reference to Fig. 1, column 2, line 47 bridging to column 6, line 59, Lowder discloses an improved diamond abrasive tool and method of manufacture characterized by a direct brazing technique of diamond crystals to a substrate surface which requires no pre-conditioning of the surface of the diamond in order to obtain the necessary wetting thereof. The method employed utilizes readily available, very hard and durable brazing alloys which have been discovered to readily wet the diamond surface to obtain a final product wherein the minimum depth of the alloy bond tends to occur intermediate adjacent diamond crystals with outstanding retention of the crystals and greatly extended tool life. In column 5, lines 27-35, Lowder further discloses that the application of the described invention to the manufacture of diamond abrasive tools encompasses a great variety of sizes, shapes, and types of tools from extremely thin abrasive discs to larger diameter grinding wheels and saw blades.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the abrasive tool of Asada with a cutting element having a cutting surface with a negative angle of inclination with respect to the intended direction of

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movement as taught by Scott'072 to reduce the area of contact between the material to be cut and the cutting element, and thereby reduces the force required to accomplish the cutting action; and further modified with the brazing method of Lowder et al.'673, in order to wet the diamond surface to chemically bond the diamond to the tooth substrate to provide a very strong securement of the diamond to the tooth.

In regard to claims 4-12, 15-26, and 31-32, it would have been obvious matter of design choice to select the grain concentration and hardness index for the tooth depending on the material to be cut. Such engineering specification is well within the skill of the artisan.

In regard to claims 33-34, it would have been obvious matter design choice to apply the cutting element to core drills or abrasive sheets depending on the intended use.

(11) *Response to Argument*

The examiner recognized that the applicant used unconventional language to claim a three-dimensional abrading tool having a plurality of teeth coated with diamond abrasive. As the abrading tool wears down a fresh layer of diamond abrasive exposes. The chemically bonded method employed by the applicant to bond the diamond to the teeth is nothing more than the notoriously well-known brazing method disclosed by the prior art.

In response to applicant's argument that the combination of Asada, Scott, and Lowder does not suggest the claimed invention, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references.

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Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, as described in the above rejection Scott discloses cutting element 34 wearing at its trailing edge, always leaving a next row of particles in abrading contact with the material to be cut. Essentially, so does the claimed invention.

In response the applicant's Second Declaration, the Examiner feels that although the test result may be true, but that does not necessarily render the claimed invention unobvious or overcome the combined prior art.

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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

George Nguyen
Patent Examiner

George Nguyen
June 10, 1999

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